

**AD 71063**

# **Armed Services Technical Information Agency**

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**UNCLASSIFIED**

Studies on the Prevention of Tooth Decay

Progress Report--December 1, 1952 to June 30, 1953

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1. The specific objectives of this project are:

- a. To determine the caries-susceptibility of genetically homogeneous strains of rats and mice.
- b. To investigate constitutional differences between caries-resistant and caries-susceptible strains of mice and rats.

2. The progress made in the past seven months can best be reported in two parts which are comparable to the above objectives.

a. Caries-susceptibility. Young representatives of six strains of rat (*Rattus norvegicus*) have been purchased from the Wistar Institute and allowed to adjust themselves to the controlled environmental circumstances of this laboratory. During this period and continuously throughout their breeding life, they are being maintained on standardized purified rations. At the present time, the representatives of each of these strains have established a small breeding colony, the offspring of which are being used in the caries susceptibility trials. By way of summary, it can be stated that the 24 young adults purchased as foundation stock for these strains have produced a little over 200 offspring. Of this first generation, 120 have been taken for preliminary experimental tests of the caries-susceptibility of the respective strains. At weaning each litter is being divided into three groups, the first of which is being fed our standard, cariogenic, purified ration, the second is receiving the Navy modification of the Hoppert-Webber-Canniff diet, and the third is being maintained on McClure's heated cereal diet. It is believed that the parallel use of these rations will yield a more accurate index of the caries-susceptibility of these strains than could be obtained by the selection of only one of these rations for these trials. At the end of suitable experimental periods which will vary depending on the caries resistance of each strain, the animals will be sacrificed and their caries scores determined. During the experimental period, each rat is given an oral examination monthly to enable a rough assessment of the caries-susceptibility to be made.

The remaining 80 members of the first generation have been maintained in the stock colony to increase its size and more importantly to have breeding stock where the entire dietary background is known and controlled. The oldest members of the first generation have matured and have been mated. The second generation offspring will be used for more exacting experimental tests of caries-susceptibility than would be possible with the first generation animals.

Older representatives of an additional four strains of rat were obtained from the Wistar Institute. At that time no younger representatives were available for these strains. However, these specimens were sufficiently old that they have not bred and additional representatives will have to be obtained.

Studies with mice are to be begun during the summer so that by the end of the present contract year, several strains of mice will be under investigation with respect to their caries-resistance.

b. Genetic Constitution. As a preliminary training phase of the analytical assessment of differences between the caries-resistant and caries-susceptible strains, the standard methods for calcium, phosphorus, sodium, potassium and carbonate were perfected with samples of enamel and dentin from selected rhesus monkey teeth. This has supplied us with an appreciable body of quantitative data on monkey teeth which has heretofore been unavailable.

Now in the second phase, the composition of the teeth and the mineral metabolism of strains of rats which have widely divergent caries-susceptibility are being investigated. For the tooth composition studies, rats from our caries-resistant Harvard strain and from our adaptation of the caries-susceptible Navy strain are being selected at ages when their third molars are fully erupted. After sacrifice, the molars are removed, cleaned and separated into their component parts by the centrifugation-flotation procedures, and then the above determinations made thereon.

3. No papers have been published nor manuscripts submitted during the first seven months of operation.

4. (a). There has been no change in direction or emphasis of the project since its inception. The early results reported above indicate the necessity to pursue the original objectives exhaustively before any change would be indicated.

(b). The following personnel have been employed:-

Professional assistant--Aina Marija Auskaps, D.D.S. (Munich), beginning  
December 1, 1952,  
(See attached biographical sketch)

Animal caretaker, half time, Alexander Bennett, beginning, December  
1, 1952.

Analyst, Ora L. Ashley, beginning January 16, 1953.

(c). No graduate students are connected with this contract at the present time.

(d). No research support has been received or withdrawn by other sources for the studies being conducted under this contract.

(e). No difficulties have been encountered as yet.

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